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December 22, 2003
Date of Signature

Re:	Application of:	Slater et al.
	Serial No.:	09/748,720
	Filed:	December 26, 2000
	For:	Excessive Surge Protection Method and Apparatus
	Group Art Unit:	2836
	Examiner:	Danny Nguyen
	Our Docket:	1505-0094

TRANSMITTAL OF BRIEF ON APPEAL

Please find for filing in connection with the above patent application the following documents:

1. Original of the Brief On Appeal;
2. Three (3) copies of the Brief On Appeal;
3. A Check in the amount of $330.00; and
4. One (1) return post card.

Please charge any fee deficiency, or credit any overpayment, to Deposit Account No. 13-0014; but not to include any payment of issue fees.

Respectfully Submitted,

MAGINOT, MOORE & BECK

December 22, 2003

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Enclosures

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BRIEF ON APPEAL

Sir:

This is an appeal under 37 CFR § 1.191 to the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office from the final rejection of claims 1-5 and 24-38 of the above-identified patent application. These claims were indicated as finally rejected in an Office Action dated July 23, 2003. Three copies of the

brief are filed herewith. A check in the amount of **$330.00** is provided herewith to cover the fee required under 37 CFR § 1.17(f). Also, please provide any extension of time which may be necessary and charge any fees which may be due to Deposit Account No. 13-0014, but not to include any payment of issue fees.

(1) REAL PARTY IN INTEREST

Landis+Gyr Inc. is the owner of this patent application, and therefore the real party in interest.

(2) RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to this patent application.

(3) STATUS OF CLAIMS

Claims 1-5 and 24-38 are pending in the application. Claims 6-23 have been withdrawn from consideration.

Claims 1-5 and 24-38 stand rejected and form the subject matter of this appeal. Claims 1-5 and 24-38 are shown in the Appendix attached to this Appeal Brief.

(4) STATUS OF AMENDMENTS

Applicants filed a Response to Office Action dated May 6, 2003 ("Response") responsive to an Office Action dated November 6, 2002. A final Office Action dated July 23, 2003 was designated by the Examiner to be responsive to the Response.

(5) SUMMARY OF THE INVENTION

The present invention is directed to a surge protection device that includes a circuit composed of components connected in series. (See, e.g. application at Fig. 3). While the invention is set forth in the claims, exemplary embodiments are discussed in the application in connection with Fig. 3. With reference to Fig. 3 of the application the surge protection device 11 includes a voltage input 7 connected to the voltage source 2, which is a utility power line. An inductor 8 is series connected between the voltage input 7 and a resistor 14. The other end of resistor 14 is connected to a first end of a PPTC 3. The other end of the PPTC 3 is connected to a resistor 4 that is part of a surge protection circuit mounted on printed wiring board 1. The other end of resistor 4 is connected to an MOV 5 that is disposed in parallel with the load 6. The voltage source 2, MOV 5, and the load 6 are each connected to a common ground at their respective other ends. (Application at p.7, Fig. 3).

The voltage input 7 may suitably be an input of any circuit (load 6) that is coupled to an electrical utility power line. Electrical utility power lines have AC voltage levels that may be 120 volts, 240 volts, 480 volts, as well as other levels. In the context of a 480 volt AC utility power line, potential overvoltages have been reported at up to 20000 volts. The exemplary embodiment described herein is configured to accommodate overvoltages of this magnitude, as well as lesser magnitude overvoltages. (*Id.* at pp.7-8)

The PPTC 3 is a polymeric positive temperature coefficient device used as a resettable fuse. Such devices have the characteristic that they stop conducting as their temperature exceeds a threshold. The device characteristics are such that below the PPTC's pass current level, the PPTC operates as a resistor of nominal resistance.

However, in excess of its specified threshold current, its temperature increases to a point in which its resistance increases. If the current remains above the PPTC's threshold, the PPTC will trip and behave as an open circuit. The trip time decreases as the current increases. Suitable PPTC devices include the available from Raychem Corp. of Menlo Park, California. In the exemplary embodiment described herein, the PPTC 3 has a 145 milliampere maximum pass current, and by way of example, has a trip-time current curve such that it will trip in 10 seconds if the current is 400 milliampere, and in 0.45 seconds if the current is 1 ampere. (*Id.* at p.8)

The resistor 14 may suitably be a wire wound, axial lead type resistor. The resistor 14 is selected to assure that the minimum resistance does not drop below a threshold necessary to limit surge current, and subsequent power follow through, to a maximum current amount. Typical values for the resistor 14 are 50 ohms, 20 ohms, or 10 ohms. In a preferred embodiment, the resistor 14 is a 50 ohm, 4 watt resistor. The use of an axial lead resistor reduces the possibility of a sustained arc in the event of a failure of the resistor. (*Id.*)

The inductor 8 is used to prevent short duration current spikes from appearing at the PPTC 3 as well as the printed wiring board 1. The prevention of short duration current spikes reduces the possibility that a transient overvoltage will damage portions of the load 6 or the PPTC 3. In the exemplary embodiment described herein, the inductor 8 is a 100 microhenry inductor having a dc resistance of 3.2 ohms. The inductor 8 should be chosen such that it suppresses transient currents for a sufficient time to let the PPTC 3 begin to restrict the current for at least some overvoltage levels within the range of

expected overvoltages. The purpose of preventing high impulse currents from reaching the PPTC 3 is to prolong the life of the PPTC 3. (*Id.* at pp.8-9)

It is recognized that size constraints can limit the inductor that is used. Those of ordinary skill in the art may readily select an appropriate inductor to suit their current suppression and size constraints. (*Id.* at p.9)

The surge protection device 11 preferably further includes a protective barrier 10 that separates or isolates the inductor 8, resistor 14, and PPTC 3 from the load 6. The protective barrier 10 may take infinitely various forms, but basically includes a wall, sleeve or compartment constructed of inflammable material, such as, for example, certain plastics. (*Id.*)

The load 6 will typically include a housing, not shown, that may incorporate such a barrier, or in which such a barrier may be defined. For example, in U.S. Patent No. 5,933,004, which is incorporated herein by reference, a utility meter is shown in that includes a load circuit board (element 34 of that patent) and an electrically safe interface (element 26). In such an embodiment, by placing the inductor 8, resistor 14 and the PPTC 3 on the opposite side of the electrically safe interface from the load circuit board, the electrically safe interface serves as the protective barrier 10 according to the present invention. (*Id.*)

Alternatively, the protective barrier 10 may comprise a protective sleeve constructed out of a shrink tube or shrink packaging element that largely surrounds the inductor 8, resistor 14, and the PPTC 3. The protective sleeve can be formed from any suitable electrical insulator such as PTFE or plastic. (*Id.* at p.10)

In general, the protective barrier 10 must resist combustion and must inhibit flying debris that may occur upon the failure of any or all of the inductor 8, resistor 14, and PPTC 3 from reaching the load 6 to prevent such debris from causing secondary arcing between components and/or connectors in the load 6 (i.e. on the circuit board 1). Those of ordinary skill in the art may readily define their own protective barrier 10 to suit the construction and housing of their particular load 6. For the purposes of the discussion herein, the load 6 is considered to include any elements on the printed circuit board 1 that pose a potential arcing hazard. (*Id*)

The protective barrier 10 provides a safeguard in the event of a catastrophic failure of any of the inductor 8, the resistor 14 and the PPTC 3. As discussed above, without the protective barrier 10, a catastrophic failure could result in emitted debris, which can initiate secondary arcing in the circuitry or contacts of the load 6. To facilitate containment of any such debris, the protective barrier 10 physically isolates the inductor 8, the resistor 14, and the PPTC from the load 6 (and/or other circuitry on the printed circuit board 1). (*Id.*)

In normal operation, the voltage source 2 provides normal line voltages to the load 6 through the inductor 8, the resistor 14, the PPTC 3, and the resistor 4. In the event of an overvoltage that results, or attempts to result in an arc, the inductor 8 immediately acts to suppress high transient currents that could support an arc. In the event that overvoltage continues, the resistor 14 operates to limit the current available to support an arc. In addition, the temperature of the PPTC 3 increases as a result of the excessive current flow. If the surge voltage is too high, then the MOV 5 starts conducting to limit the applied voltage to the load 6. (*Id.* at p.10-11)

In many cases, the operation of the PPTC 3 will sufficiently prevent any arcing until the overvoltage situation is over. Accordingly, the PPTC 3 operates as a *resettable* fuse. As a result, the surge protection device 11 does not necessary require replacement after each overvoltage event. (*Id.* at p.11)

In other cases, the overvoltage may nevertheless create an arc. If an arc occurs, then the resistor 14, inductor 8, or PPTC 3 may rupture. Such rupture, however, stops excessive currents from being sustained by creating an open circuit. Any or all of the components may rupture due to the excessive current and thus create an open circuit. The protective barrier 10 inhibits and preferably prevents the debris from the destroyed component from contacting the circuitry of the load 6 or other elements. (*Id.*)

A variation of the device 11 uses only the inductor 8 and PPTC 3 in series, removing the resistor 14. This embodiment is advantageous for applications where adding the resistor 14 would affect the operation of the load 6. For example, in an exemplary embodiment of the surge protection device employed within an electricity meter, addition of the resistor 14 could in some cases undesirably affect the meter's registration accuracy. Those of ordinary skill in the art may readily determine whether the added current limiting capabilities provided by addition of the resistor 14 outweigh any negative effect on the operation of the circuit of the load 6. (*Id*)

Another variation of the device 11 uses only an inductor 8 or PPTC device 3 separated by the protective barrier 10 from the load 6. Where a single breakdown device is used in the device 11, excessive currents are ultimately limited by a rupturing of the breakdown device. Otherwise, the breakdown device (inductor 8 or PPTC 3) provides the suppression capabilities discussed above in cases in which surge does not cause a

rupture. For example, the PPTC 3 increases in resistance until it behaves as an open circuit. If the PPTC 3 thereafter ruptures, it opens the circuit and thus inhibits a sustained arc. The inductor 8 alone also operates in an analogous manner. (*Id.* at pp.12)

The PPTC 3 alone may be useful in environments in which fast transient surges are relatively rare, and longer time constant, sustained surges are more prevalent. The inductor 8 alone may be useful in environments in which fast transient surges are common. (*Id.*)

In yet another embodiment, the protections provided by the combinations of the PPTC 3 and the inductor 8 (with or without the resistor 14) may be sufficient *without the protective barrier 10* if the elements are chosen to withstand the highest possible voltage surges. In any event, at least one aspect of the present invention relates to the protections provided by the combination of the inductor 8 and the PPTC 3 regardless of whether a protective barrier is present. (*Id.*)

In the selection of the components 3, 8 and 14, the desired series impedance of the surge protection device 11, and the individual resistances, transient responses and impedances of the components 3, 8, and 14 must be considered. In addition, disconnect mechanisms (not shown) can be connected in series with the components 3, 8 and 14, the disconnect mechanisms operating as a back-up for creating an open circuit between the voltage input 7 and the load 6 in the event of a prolonged overvoltage surge. In conjunction with the disconnect mechanisms, visual indicators (not shown) may also be employed, so that a disconnected line can be quickly determined. (*Id.* at pp.12-13)

The present invention thus provides surge protection above and beyond that available from a simple MOV shunt. Although the configuration shown in FIG. 3 allows

the full voltage to reach the printed circuit board 1, the circuit of the surge protection device 11 prevents high currents from damaging the circuit board 1 in part by using the series components as fusable devices. The PPTC 3 acts as a 'poly-fuse,' where the response time for opening the circuit is less than that required to induce rupture of the inductor 8 or the resistor 14. (*Id.*)

The actual performance can be customized according to the individual components used. For example, an inductor may be selected that accommodates voltages having predetermined transient characteristics, a resistor can be selected that limits steady state currents for a particular period of time, and a PPTC can be selected according to its melting temperature. In this manner, the surge protection device can be configured to optimize protection for a particular likelihood or risk of a known or suspected condition. For example, the environment for a particular application may have a high or low humidity, have a differing power factor, be proximate to high inductance machinery, have a greater susceptibility to a certain transient condition, or have differing grades of electrical utility wiring. By controlling the location of a possible arcing, the magnitude and resultant damage from an excessive overvoltage condition can be controlled. (*Id.*)

Fig. 4 shows a schematic block diagram of an exemplary electricity meter 110 that incorporates three surge protection devices 11a, 11b and 11c according to the present invention. The electricity meter 110 is shown in context installed in a three phase power system. The exemplary embodiment of the surge protection devices 11a, 11b and 11c described herein protects the meter circuitry, which is typically housed on one or more printed circuit boards, from unpredictable failure modes due to excessive overvoltages

and associated power follow through generated on the connected utility lines. (*Id.* at pp.13-14)

(6) ISSUES

Whether claim 1 is unpatentable under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,181,872 to Chermin (hereinafter "Chermin").

Whether claims 2-5, 25-29, 34 and 35 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Chermin in view of U.S. Patent No. 6,356,424 to Myong et al. (hereinafter "Myong").

Whether claims 30-33 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Chermin in view of U.S. Patent No. 6,040,971 to Martenson et al. (hereinafter "Martenson").

Whether claims 24 and 36 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Chermin in view of Myong in further view of Martenson.

(7) GROUPING OF CLAIMS

The claims do not all stand or fall together.

Claim 1 forms a first separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 3, 5 and 35 form a second separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 4, 25, 27-29, 34, 37 and 38 form a third separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claim 26 forms a fourth separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 30 and 32 form a fifth separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 24, 31, 33 and 36 form a sixth separately patentable group which is argued independently of the other claims for purposes of this appeal.

(8) ARGUMENT

Discussion re: Patentability of Claim 1

1. Claim 1

Claim 1 includes the following limitations:

> a protective barrier interposed between the inductor and the load, the protective barrier configured to physically isolate the inductor from the load.

Thus, a protective barrier is proved that is configured to *physically* isolate the inductor from the load.

2. The Examiner's Rejection

The Examiner rejected claim 1 as allegedly being anticipated by Chermin. Chermin is directed to a starter for igniting a low-pressure sodium lamp. The starter is provided with an oscillator circuit consisiting of an electric coil, a first capacitor and a controlled semiconductor switching element. (See Chermin, Abstract). A positive temperature coefficient device is provided to increase the resistance of the circuit in the even that the lamp refuses to ignite.

The Examiner contends that claimed inductor was met by the inductive ballast 3 of Fig. 1 of Chermin. The Examiner further contends that the resistor 6, PTC 7, coil 8 and the inductive ballast 3 together constitute a "protective barrier" that physically isolates the inductive ballast 3 from the load. (Final Office Action at p. 2).

3. Chermin Does Not Teach a Protective Barrier

Chermin does not disclose any type of barrier at all, much less one that operates to *physically* isolate the ballast 3 from any load. Contrary to the Examiner's contention, the resistor 6, PCT 7, coil 8 and ballast 3 do not physically isolate anything, and certainly do not form a protective barrier. Chermin does not disclose how those elements are physically arranged, and nothing suggests they could be arranged to form a barrier.

In particular, the ordinary interpretation of a "protective barrier" configured to provide "physical isolation" is straightforward and consistent with the teachings of the application. As taught in the application,

> "a protective barrier 10 . . . separates or isolates the inductor 8, resistor 14, and PPTC 3 from the load 6. The protective barrier 10 may take infinitely various forms, but basically includes a wall, sleeve or compartment constructed of inflammable material, such as, for example, certain plastics."

(Application at p.9, lines 11-15).

Although the protective barrier may take many forms, it still includes a physical barrier of some type. The inductive ballast 3, resistor 6, PTC 7 and coil 8 do not form any type of protective or physical barrier. Those elements provide neither physical nor electrical isolation. Moreover, Chermin neither suggests or implies the need for a protective barrier between the inductor 3 and the load. It is noted that Chermin is not even directed to a surge protection apparatus.

For at least these reasons, it is submitted that the rejection of claim 1 as anticipated by Chermin is in error and should be reversed.

Second Claim Grouping: Claims 2, 3, 5 and 35 are Not Obvious Over Chermin and Myong

Discussion re: Patentability of Claim 2

1. Claim 2

Claim 2 has the following limitation:

> polymeric positive temperature coefficient device (PPTC) coupled between the voltage input and the load; and
> a protective barrier interposed between the PPTC and the load, the protective barrier configured to physically isolate the PPTC from the load

Accordingly, claim 2 includes a protective barrier similar to claim 1, except that the protective barrier surrounds a PPTC as opposed to an inductor.

2. The Prior Art Does Not Teach a Protective Barrier

As an initial matter, the Examiner has failed to set out a prima facie case of obviousness for similar reasons as those set forth above in connection with claim 1. In particular, the Examiner has rejected claim 2 as allegedly being obvious over Chermin in view of Myong. As discussed above in connection with claim 1, Chermin does not teach a protective barrier. The Examiner has not alleged that Myong teaches a protective barrier, nor does it appear that Myong contains any such teaching. Accordingly, the combination of Chermin and Myong as proposed by the Examiner does not arrive at the invention of claim 2.

3. No Motivation to Modify Chermin as Proposed by the Examiner

Claim 2 is patentable for reasons independent of those relating to the protective barrier. In particular, in the Final Office Action, the Examiner concedes that Chermin does not teach a PPTC. (Final Office Action at p.3) Instead, the Examiner alleges that it would have been obvious to combine the PPTC of Myong with the arrangement of Chermin. In particular, the Examiner set forth the following reasoning for the proposed combination:

> Chermin does not disclose a polymeric positive temperature coefficient. Myong et al. disclose a polymer PTC (col. 1, lines 46). It would have been obvious to one having skill in the art to modify the circuit of Chermin with a PPTC as taught by Myong in order to protect components from excess current or temperature (Myong et al., col. 1, lines 29-42).

(Final Office Action at p.3).

Applicants respectfully submit that there is no motivation or suggestion to combine Chermin and Myong as proposed by the Examiner. As an initial matter, Chermin employs a PTC to *reduce power consumption* in a sodium gas lamp igniter when the lamp will not ignite. (See e.g. Chermin at col. 1, lines 21-32). Chermin does not appear to require anything to "protect components from excess current or temperature", as suggested by the Examiner. Moreover, Myong does not appear to suggest that a PPTC is more capable of protecting components from excess current or temperature than other PTCs.

At best, Myong suggests that PPTCs "have higher resistivities" than other PTCs. (Myong at col. 1, lines 37-41). However, it is not entirely clear that a higher resistivity translates into better protection against excess current or temperature. Even if higher resistivity provided better protection, Chermin is not directed to a device having the primary purpose of protection against overcurrent or temperature. The PTC of Chermin

instead is intended to reduce current when the operation of the igniter is not necessary. To this end, the PTC of Chermin provides a load-shedding function.

Myong contains no teaching that a PPTC is particularly advantageous in a device similar to that of Chermin. Instead, Myong is directed to traditional fault handling operations and protection against overcurrent. While a higher resistivity might be useful in such situations, Myong neither suggests nor implies that higher resistivity is useful in *all* applications of PTCs. Thus, Myong does not suggest that a PPTC is advantageous over a PTC in the circuit of Chermin.

For this reason, as well as the reason that neither reference teaches a protective barrier as claimed, it is respectfully submitted that the rejection of claim 2 as being obvious over Chermin in view of Myong is in error and should be reversed.

Discussion re: Patentability of Claim 3

Claim 3 stands rejected as allegedly being obvious over Chermin in view of Myong. Claim 3 incorporates all of the limitations of claim 1, and therefore recites a protective barrier. Claim 3 further recites the PPTC that is isolated from the load by the protective barrier, similar to claim 2. As discussed above, neither Chermin nor Myong teach such a protective barrier. Moreover, there is no legally sufficient motivation or suggestion to modify Chermin to include a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 2, it is respectfully submitted that the obviousness rejection of claim 3 should be reversed.

Discussion re: Patentability of Claim 5

Claim 5 stands rejected as allegedly being obvious over Chermin in view of Myong. Claim 5 recites "a protective barrier interposed between the load and the inductor, the resistor and the PPTC, the protective barrier configured to physically isolate the inductor, the resistor and the PPTC from the load". As discussed above, neither Chermin nor Myong teach such a protective barrier. Moreover, there is no legally sufficient motivation or suggestion to modify Chermin to include a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 2, it is respectfully submitted that the obviousness rejection of claim 5 should be reversed.

Discussion re: Patentability of Claim 35

Claim 35 stands rejected as allegedly being obvious over Chermin in view of Myong. Claim 35 recites "a protective barrier configured to physically isolate both the inductor and the PPTC from the load". As discussed above, neither Chermin nor Myong teach such a protective barrier. Moreover, there is no legally sufficient motivation or suggestion to modify Chermin to include a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 2, it is respectfully submitted that the obviousness rejection of claim 5 should be reversed.

Third Claim Grouping: Claims 4, 25, 27-29, 34, 37 and 38 are Not Obvious Over Chermin and Myong

Discussion re: Patentability of Claim 4

1. Claim 4

Claim 4 has the following limitation:

> an inductor, a separate resistor, and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load

Claim 4 differs from the First and Second Claim Groupings in that it does not recite a protective barrier.

2. No Motivation to Combine References

As discussed above in connection with claim 2, the Examiner concedes that Chermin does not teach the use of a PPTC. (Final Office Action at p.3). Instead, the Examiner alleges that it would have been obvious to combine the PPTC of Myong with the arrangement of Chermin. As also discussed above, there is no motivation or suggestion to combine Chermin and Myong as proposed by the Examiner.

In particular, Chermin employs a PTC to reduce power consumption in a sodium gas lamp igniter when the lamp will not ignite. (See e.g. Chermin at col. 1, lines 21-32). Chermin does not appear to require anything to "protect components from excess current or temperature", as suggested by the Examiner. Chermin does not allege that there is a danger of excess currents or temperature. The PTC device is used as part of normal operation, and changes state effectively *when a light bulb burns out.* Thus, whatever motivation is provided by Myong to use a PPTC is not applicable to Chermin.

Accordingly, for reasons discussed above in connection with claim 2, the Examiner has not set forth a legally sufficient motivation or suggestion to modify Chermin to include a PPTC such as is taught by Myong.

Discussion re: Patentability of Claims 25 and 27-29

Claims 25 and 27-29 also stand rejected as allegedly being obvious over Chermin in view of Myong. Claims 25 and 27-29 all depend from and incorporate all of the limitations of claim 4. Accordingly, for at least the same reasons as those set forth above in connection with claim 4, it is respectfully submitted that the obviousness rejection of claims 25 and 27-29 should be reversed.

Discussion re: Patentability of Claim 34

Claim 34 also stands rejected as allegedly being obvious over Chermin in view of Myong. Claim 34 recites the following limitation: "an inductor and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load, the inductor interposed between the PPTC and the voltage input". Thus, claim 34, similar to claim 4 recites a PPTC and an inductor couple between the voltage input and the load. As discussed above, there is no legally sufficient motivation or suggestion to modify Chermin to include a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 4, it is respectfully submitted that the obviousness rejection of claim 34 should be reversed.

Discussion re: Patentability of Claims 37 and 38

Claims 37 and 38 stand rejected as allegedly being obvious over Chermin in view of Myong. Claims 37 and 38 both depend from and incorporate all of the limitations of claim 34. Accordingly, for at least the same reasons as those set forth above in connection with claim 34, it is respectfully submitted that the obviousness rejection of claims 37 and 38 should be reversed.

Fourth Claim Grouping: Claim 26 is Not Obvious Over Chermin and Myong

Discussion re: Patentability of Claim 26

1. Claim 26 depends from Claim 25

Claim 26 stands rejected as allegedly being obvious over Chermin in view of Myong. As an initial matter, claim 26 depends from and incorporates all the limitations of claim 25. As discussed above, claim 25 depends from and incorporates all of the limitations of claim 4. Accordingly, claim 26 is patentable over the prior art for at least the same reasons as those set forth above in connection with claims 4 and 25.

2. Additional Limitations of Claims 26

Claims 26 also recites the following limitations:

> wherein the separate resistor has a resistance of approximately 50 ohms

3. Chermin Does Not Teach or Suggest a Fifty Ohm Resistor

With regard to claim 26, the Examiner merely alleges that Chermin discloses a 220 ohm resistor. (Final Office Action at p.3). A 220 ohm resistor exceeds the resistance

of a 50 ohm resistor by more than a factor of four. One of ordinary skill in the art would not consider the quantity of 220 ohms to be approximately 50 ohms.

Accordingly, the combination of Chermin and Myong fails to teach all of the elements of claim 26. As a consequence, for reasons independent of those set forth above in connection with claim 4, it is submitted that the rejection of claim 26 is in error and should be reversed.

Fifth Claim Grouping: Claims 30 and 32 Are Not Obvious Over Chermin and Martenson

Discussion re: Patentability of Claim 30

1. Claim 30 depends from Claim 1

Claim 30 stands rejected as allegedly being obvious over Chermin, Myong and Martenson. As an initial matter, claim 30 depends from and incorporates all the limitations of claim 1. Claim 30 also recites the following limitations:

> wherein the protective barrier includes a protective sleeve that receives the inductor

2. None of the Prior Art Discloses a Protective Sleeve

None of the cited art discloses a protective sleeve. In the Final Office Action, the Examiner appears to admit that Chermin does not teach a protective sleeve. (See generally p.4). Instead, the Examiner relies on Martenson for the teaching of a protective housing. (*Id.*)

The plastic housing of Martenson does not constitute a protective sleeve, as per claim 30. The plastic housing is a box-like compartment, which is not a sleeve. For this reason, among others, the rejection of claim 30 over the combination of Chermin and

Martenson should be reversed.

3. No Motivation or Suggestion to Combine Chermin and Martenson as Proposed

Claim 30 is also patentable because there is no motivation to combine Chermin and Martenson as proposed by the Examiner. As discussed above, the Examiner contends that it would have been obvious to combine the housing 32 of Martenson with the arrangement of Chermin. In particular, the Examiner set forth the following reasoning for the proposed combination:

> Chermin does not explicitly disclose a plastic housing houses the components of the circuit. Martenson et al. disclose a housing 32 (fig. 2). It would have been obvious to one having skill in the art to modify the circuit of Chermin with a housing as taught by Martenson et al. in order to protect the sudden failure of the components of the circuit that result in breakdown of an entire system.

(Final Office Action at p.4).

Applicants respectfully submit that the Examiner has set forth no legally sufficient motivation or suggestion to combine Chermin and Martenson as proposed. First, there is no teaching or suggestion of a need for protection against sudden failure in Chermin. Chermin and Martenson are directed to vastly different devices having different needs. There is no indication that there is a need for protection in Chermin similar to the need for protection in Martenson. Moreover, even if protection against sudden failure was advantageous in Chermin, there is no indication that the inductor of Chermin is subject to a catastrophic failure, and thus requires a protective housing.

With regard to the need for protection, Martenson is directed to surge protection devices for "highly sensitive electronic components". These highly sensitive electronic components include computer and computer-related equipment. Such devices, it is noted, have significant amounts of digital processing circuitry, as well a disk drive motors,

screen displays and the like. As a consequence of the sensitivity, complexity and expense of such circuits, complex surge protection circuits such as the type shown in Figs. 1 and 2 of Martenson are justified.

By contrast, Chermin is directed to a sodium gas lamp and its igniter circuit. There are very few circuit elements in Chermin as compared to a computer and computer-related equipment. Such elements, moreover, would seem to be something less than "highly sensitive". Thus, the circuit of Chermin does not need a complex surge protection circuit similar to that of Martenson, nor all of the protections it affords. Indeed, if one or two elements of Chermin were to catastrophically fail, it probably would not be significantly more expensive as a practical matter to replace the whole circuit of Chermin.

In contrast to a mere lamp exciter circuit, the failure of a computer system is significantly more costly, and thus may justify additional protective housing elements as taught Martenson. In other words, Martenson simply does not suggest the desirability of a plastic housing for all circuits of all kinds.

In addition, neither Martenson nor Chermin suggest that an inductor is prone to catastrophic failure, and thus would require a housing for protection of the exciter circuit. As a consequence, even if the prior art contained a suggestion to provide protection against catastrophic failure in a lamp igniter circuit, none of the prior art imply that the inductor of Chermin would be the source of the catastrophic failure.

In particular, to the extent Martenson teaches the use of a housing for protection, Martenson teaches the use of a housing specifically to protect against the catastrophic failure of MOVs. To this end, Martenson describes the existence of a problem with the

catastrophic failure of MOVs when they are used for surge protection. (See Martenson at col. 2, lines 62). Martenson teaches the use of the plastic housing 32 which helps in the event of a catastrophic failure of an MOV. (See *id.* at col. 9, lines 40-47).

However, Chermin does not employ an MOV, and therefore is not prone to catastrophic failures of MOVs. As a consequence, nothing in Martenson could be interpreted as suggesting the employment of a plastic housing for one or more devices in Chermin.

In conclusion, it is clear that Martenson and Chermin are directed to different components (MOV vs. inductor) in a different circuit (surge protection vs. lamp igniter) in a different environment (computer devices vs. gas lamp). For this reason, it is respectfully submitted that there is no motivation or suggestion to modify Chermin to employ the housing of Martenson.

For this reason, as well as the reason that neither reference teaches a protective sleeve as claimed, it is respectfully submitted that the rejection of claim 30 as being obvious over Chermin in view of Martenson is in error and should be reversed.

Discussion re: Patentability of Claim 32

Claim 32 also stands rejected as allegedly being obvious over Chermin in view of Martenson. Claim 32 recites the following limitation: "a protective barrier interposed between the inductor and the load, the protective barrier configured to physically isolate the inductor from the load, the protective barrier including a protective sleeve that receives the inductor". Thus, claim 32, similar to claim 30 recites an inductor received by a protective sleeve. As discussed above, neither Chermin nor Martenson teach or

suggest a protective sleeve. Moreover, there is no legally sufficient motivation or suggestion to modify Chermin to include a protective housing, much less a sleeve. Accordingly, for at least the same reasons as those set forth above in connection with claim 30, it is respectfully submitted that the obviousness rejection of claim 32 should be reversed.

Sixth Claim Grouping: Claims 24, 31, 33 and 36 Are Not Obvious Over the Prior Art

Discussion re: Patentability of Claim 24

1. Claim 24 Recites a PPTC

Claim 24 stands rejected as allegedly being obvious over Chermin, Myong and Martenson. As an initial matter, claim 24 depends from and incorporates all the limitations of claim 5. As a consequence, claim 24 includes a limitation directed to a PPTC connected to the inductor. As discussed above in connection with the Second Claim Grouping, there is no motivation or suggestion to modify Chermin by implementing the PPTC of Myong. In addition, Martenson does not teach or suggest the use of a PPTC.

2. Claim 24 Also Recites a Protective Sleeve

Claim 24 also recites the following limitations:

> wherein the protective barrier includes a protective sleeve

As discussed above in connection with claim 30, none of the cited art discloses a protective sleeve. Moreover, even if the housing of Martenson could be construed to be a

sleeve, there is no motivation or suggestion to modify Chermin to include the housing of Martenson.

Thus, because there is no motivation or suggestion to modify Chermin to include the PPTC of Myong, because there is no motivation or suggestion to modify Chermin to include the plastic housing of Martenson, and because none of Chermin, Myong and Martenson teach or suggest a protective sleeve, the rejection of claim 24 should be reversed.

Discussion re: Patentability of Claims 31, 33 and 36

Claims 31, 33 and 36 all include limitations directed to a protective sleeve and a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 24, it is respectfully submitted that the obviousness rejection of claims 31, 33 and 36 should be reversed.

(9) CONCLUSION

For all of the foregoing reasons, claim 1 is not unpatentable under 35 U.S.C. § 102(b), and claims 2-5 and 24-38 are not unpatentable under 35 U.S.C. § 103(a). As a consequence, the Board of Appeals is respectfully requested to reverse the rejection of these claims.

Respectfully submitted,

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CLAIM APPENDIX

1. (amended) A surge protection apparatus connected between an AC electrical utility power line and a load, comprising:

a voltage input coupled to the AC electrical utility power line, the AC electrical utility power line having a nominal AC voltage of at least about 120 volts;

an inductor coupled between the voltage input and the load; and

a protective barrier interposed between the inductor and the load, the protective barrier configured to physically isolate the inductor from the load.

2. (amended) A surge protection apparatus connected between an AC electrical utility power line and a load, comprising:

a voltage input coupled to the AC electrical utility power line, the AC electrical utility power line having a nominal AC voltage of at least about 120 volts;

an polymeric positive temperature coefficient device (PPTC) coupled between the voltage input and the load; and

a protective barrier interposed between the PPTC and the load, the protective barrier configured to physically isolate the PPTC from the load.

3. An apparatus as claimed in claim 1, further comprising a polymeric positive temperature coefficient device (PPTC) connected in series with the inductor between the voltage source and the load, wherein the protective barrier is configured to physically isolate both the inductor and the PPTC from the load.

4. (amended) A surge protection apparatus connected between an electrical power line and a load, comprising:

a voltage input coupled to the electrical power line;

an inductor, a separate resistor, and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load.

5. The surge protection apparatus of claim 4, further comprising a protective barrier interposed between the load and the inductor, the resistor and the PPTC, the protective barrier configured to physically isolate the inductor, the resistor and the PPTC from the load.

24. The surge protection apparatus of claim 5 wherein the protective barrier includes a protective sleeve.

25. The surge protection apparatus of claim 4 wherein the separate resistor has a resistance of at least 10 ohms.

26. The surge protection apparatus of claim 25 wherein the separate resistor has a resistance of approximately 50 ohms.

27. The surge protection apparatus of claim 4 wherein the separate resistor includes axial leads.

28. The surge protection apparatus of claim 4 wherein the inductor is interposed between the voltage input and PPTC.

29. The surge protection apparatus of claim 4 wherein the voltage input is coupled to an AC electrical utility power line.

30. The surge protection apparatus of claim 1 wherein the protective barrier includes a protective sleeve that receives the inductor.

31. The surge protection apparatus of claim 2 wherein the protective barrier includes a protective sleeve that receives the PPTC.

32. A surge protection apparatus connected between an electrical power line source and a load, comprising:

a voltage input coupled to the electrical power line;

an inductor coupled between the voltage input and the load; and

a protective barrier interposed between the inductor and the load, the protective barrier configured to physically isolate the inductor from the load, the protective barrier including a protective sleeve that receives the inductor.

33. The surge protection apparatus of claim 32 further comprising a PPTC coupled in series with the inductor between the voltage input and the load, the PPTC received by the protective sleeve.

34. A surge protection apparatus connected between an electrical power line source and a load, comprising:

a voltage input coupled to the electrical power line; and

an inductor and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load, the inductor interposed between the PPTC and the voltage input.

35. The surge protection apparatus of claim 34 further comprising:

a protective barrier configured to physically isolate both the inductor and the PPTC from the load.

36. The surge protection apparatus of claim 35 wherein the protective barrier includes a protective sleeve that receives the inductor and the PPTC.

37. A surge protection apparatus connected between an electrical power line and a load, comprising:

a voltage input coupled to the electrical power line;

an inductor, a resistor having a resistance of at least about 10 ohms, and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load.

38. (new) The surge protection apparatus of claim 37 wherein the resistor includes axial leads.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Name of person mailing document or fee

Signature

12/22/2003
Date of Signature

Re:	Application of:	Slater et al.
	Serial No.:	09/748,720
	Filed:	December 26, 2000
	For:	Excessive Surge Protection Method and Apparatus
	Group Art Unit:	2836
	Examiner:	D. Nguyen
	Our Docket:	1505-0094

BRIEF ON APPEAL

Sir:

This is an appeal under 37 CFR § 1.191 to the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office from the final rejection of claims 1-5 and 24-38 of the above-identified patent application. These claims were indicated as finally rejected in an Office Action dated July 23, 2003. Three copies of the

brief are filed herewith. A check in the amount of **$330.00** is provided herewith to cover the fee required under 37 CFR § 1.17(f). Also, please provide any extension of time which may be necessary and charge any fees which may be due to Deposit Account No. 13-0014, but not to include any payment of issue fees.

(1) REAL PARTY IN INTEREST

Landis+Gyr Inc. is the owner of this patent application, and therefore the real party in interest.

(2) RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to this patent application.

(3) STATUS OF CLAIMS

Claims 1-5 and 24-38 are pending in the application. Claims 6-23 have been withdrawn from consideration.

Claims 1-5 and 24-38 stand rejected and form the subject matter of this appeal. Claims 1-5 and 24-38 are shown in the Appendix attached to this Appeal Brief.

(4) STATUS OF AMENDMENTS

Applicants filed a Response to Office Action dated May 6, 2003 ("Response") responsive to an Office Action dated November 6, 2002. A final Office Action dated July 23, 2003 was designated by the Examiner to be responsive to the Response.

(5) SUMMARY OF THE INVENTION

The present invention is directed to a surge protection device that includes a circuit composed of components connected in series. (See, e.g. application at Fig. 3). While the invention is set forth in the claims, exemplary embodiments are discussed in the application in connection with Fig. 3. With reference to Fig. 3 of the application the surge protection device 11 includes a voltage input 7 connected to the voltage source 2, which is a utility power line. An inductor 8 is series connected between the voltage input 7 and a resistor 14. The other end of resistor 14 is connected to a first end of a PPTC 3. The other end of the PPTC 3 is connected to a resistor 4 that is part of a surge protection circuit mounted on printed wiring board 1. The other end of resistor 4 is connected to an MOV 5 that is disposed in parallel with the load 6. The voltage source 2, MOV 5, and the load 6 are each connected to a common ground at their respective other ends. (Application at p.7, Fig. 3).

The voltage input 7 may suitably be an input of any circuit (load 6) that is coupled to an electrical utility power line. Electrical utility power lines have AC voltage levels that may be 120 volts, 240 volts, 480 volts, as well as other levels. In the context of a 480 volt AC utility power line, potential overvoltages have been reported at up to 20000 volts. The exemplary embodiment described herein is configured to accommodate overvoltages of this magnitude, as well as lesser magnitude overvoltages. (*Id.* at pp.7-8)

The PPTC 3 is a polymeric positive temperature coefficient device used as a resettable fuse. Such devices have the characteristic that they stop conducting as their temperature exceeds a threshold. The device characteristics are such that below the PPTC's pass current level, the PPTC operates as a resistor of nominal resistance.

However, in excess of its specified threshold current, its temperature increases to a point in which its resistance increases. If the current remains above the PPTC's threshold, the PPTC will trip and behave as an open circuit. The trip time decreases as the current increases. Suitable PPTC devices include the available from Raychem Corp. of Menlo Park, California. In the exemplary embodiment described herein, the PPTC 3 has a 145 milliampere maximum pass current, and by way of example, has a trip-time current curve such that it will trip in 10 seconds if the current is 400 milliampere, and in 0.45 seconds if the current is 1 ampere. (*Id.* at p.8)

The resistor 14 may suitably be a wire wound, axial lead type resistor. The resistor 14 is selected to assure that the minimum resistance does not drop below a threshold necessary to limit surge current, and subsequent power follow through, to a maximum current amount. Typical values for the resistor 14 are 50 ohms, 20 ohms, or 10 ohms. In a preferred embodiment, the resistor 14 is a 50 ohm, 4 watt resistor. The use of an axial lead resistor reduces the possibility of a sustained arc in the event of a failure of the resistor. (*Id.*)

The inductor 8 is used to prevent short duration current spikes from appearing at the PPTC 3 as well as the printed wiring board 1. The prevention of short duration current spikes reduces the possibility that a transient overvoltage will damage portions of the load 6 or the PPTC 3. In the exemplary embodiment described herein, the inductor 8 is a 100 microhenry inductor having a dc resistance of 3.2 ohms. The inductor 8 should be chosen such that it suppresses transient currents for a sufficient time to let the PPTC 3 begin to restrict the current for at least some overvoltage levels within the range of

expected overvoltages. The purpose of preventing high impulse currents from reaching the PPTC 3 is to prolong the life of the PPTC 3. (*Id.* at pp.8-9)

It is recognized that size constraints can limit the inductor that is used. Those of ordinary skill in the art may readily select an appropriate inductor to suit their current suppression and size constraints. (*Id.* at p.9)

The surge protection device 11 preferably further includes a protective barrier 10 that separates or isolates the inductor 8, resistor 14, and PPTC 3 from the load 6. The protective barrier 10 may take infinitely various forms, but basically includes a wall, sleeve or compartment constructed of inflammable material, such as, for example, certain plastics. (*Id.*)

The load 6 will typically include a housing, not shown, that may incorporate such a barrier; or in which such a barrier may be defined. For example, in U.S. Patent No. 5,933,004, which is incorporated herein by reference, a utility meter is shown in that includes a load circuit board (element 34 of that patent) and an electrically safe interface (element 26). In such an embodiment, by placing the inductor 8, resistor 14 and the PPTC.3 on the opposite side of the electrically safe interface from the load circuit board, the electrically safe interface serves as the protective barrier 10 according to the present invention. (*Id.*)

Alternatively, the protective barrier 10 may comprise a protective sleeve constructed out of a shrink tube or shrink packaging element that largely surrounds the inductor 8, resistor 14, and the PPTC 3. The protective sleeve can be formed from any suitable electrical insulator such as PTFE or plastic. (*Id.* at p.10)

In general, the protective barrier 10 must resist combustion and must inhibit flying debris that may occur upon the failure of any or all of the inductor 8, resistor 14, and PPTC 3 from reaching the load 6 to prevent such debris from causing secondary arcing between components and/or connectors in the load 6 (i.e. on the circuit board 1). Those of ordinary skill in the art may readily define their own protective barrier 10 to suit the construction and housing of their particular load 6. For the purposes of the discussion herein, the load 6 is considered to include any elements on the printed circuit board 1 that pose a potential arcing hazard. (*Id*)

The protective barrier 10 provides a safeguard in the event of a catastrophic failure of any of the inductor 8, the resistor 14 and the PPTC 3. As discussed above, without the protective barrier 10, a catastrophic failure could result in emitted debris, which can initiate secondary arcing in the circuitry or contacts of the load 6. To facilitate containment of any such debris, the protective barrier 10 physically isolates the inductor 8, the resistor 14, and the PPTC from the load 6 (and/or other circuitry on the printed circuit board 1). (*Id.*)

In normal operation, the voltage source 2 provides normal line voltages to the load 6 through the inductor 8, the resistor 14, the PPTC 3, and the resistor 4. In the event of an overvoltage that results, or attempts to result in an arc, the inductor 8 immediately acts to suppress high transient currents that could support an arc. In the event that overvoltage continues, the resistor 14 operates to limit the current available to support an arc. In addition, the temperature of the PPTC 3 increases as a result of the excessive current flow. If the surge voltage is too high, then the MOV 5 starts conducting to limit the applied voltage to the load 6. (*Id.* at p.10-11)

In many cases, the operation of the PPTC 3 will sufficiently prevent any arcing until the overvoltage situation is over. Accordingly, the PPTC 3 operates as a *resettable* fuse. As a result, the surge protection device 11 does not necessary require replacement after each overvoltage event. (*Id.* at p.11)

In other cases, the overvoltage may nevertheless create an arc. If an arc occurs, then the resistor 14, inductor 8, or PPTC 3 may rupture. Such rupture, however, stops excessive currents from being sustained by creating an open circuit. Any or all of the components may rupture due to the excessive current and thus create an open circuit. The protective barrier 10 inhibits and preferably prevents the debris from the destroyed component from contacting the circuitry of the load 6 or other elements. (*Id.*)

A variation of the device 11 uses only the inductor 8 and PPTC 3 in series, removing the resistor 14. This embodiment is advantageous for applications where adding the resistor 14 would affect the operation of the load 6. For example, in an exemplary embodiment of the surge protection device employed within an electricity meter, addition of the resistor 14 could in some cases undesirably affect the meter's registration accuracy. Those of ordinary skill in the art may readily determine whether the added current limiting capabilities provided by addition of the resistor 14 outweigh any negative effect on the operation of the circuit of the load 6. (*Id*)

Another variation of the device 11 uses only an inductor 8 or PPTC device 3 separated by the protective barrier 10 from the load 6. Where a single breakdown device is used in the device 11, excessive currents are ultimately limited by a rupturing of the breakdown device. Otherwise, the breakdown device (inductor 8 or PPTC 3) provides the suppression capabilities discussed above in cases in which surge does not cause a

rupture. For example, the PPTC 3 increases in resistance until it behaves as an open circuit. If the PPTC 3 thereafter ruptures, it opens the circuit and thus inhibits a sustained arc. The inductor 8 alone also operates in an analogous manner. (*Id.* at pp.12)

The PPTC 3 alone may be useful in environments in which fast transient surges are relatively rare, and longer time constant, sustained surges are more prevalent. The inductor 8 alone may be useful in environments in which fast transient surges are common. (*Id.*)

In yet another embodiment, the protections provided by the combinations of the PPTC 3 and the inductor 8 (with or without the resistor 14) may be sufficient *without the protective barrier 10* if the elements are chosen to withstand the highest possible voltage surges. In any event, at least one aspect of the present invention relates to the protections provided by the combination of the inductor 8 and the PPTC 3 regardless of whether a protective barrier is present. (*Id.*)

In the selection of the components 3, 8 and 14, the desired series impedance of the surge protection device 11, and the individual resistances, transient responses and impedances of the components 3, 8, and 14 must be considered. In addition, disconnect mechanisms (not shown) can be connected in series with the components 3, 8 and 14, the disconnect mechanisms operating as a back-up for creating an open circuit between the voltage input 7 and the load 6 in the event of a prolonged overvoltage surge. In conjunction with the disconnect mechanisms, visual indicators (not shown) may also be employed, so that a disconnected line can be quickly determined. (*Id.* at pp.12-13)

The present invention thus provides surge protection above and beyond that available from a simple MOV shunt. Although the configuration shown in FIG. 3 allows

the full voltage to reach the printed circuit board 1, the circuit of the surge protection device 11 prevents high currents from damaging the circuit board 1 in part by using the series components as fusable devices. The PPTC 3 acts as a 'poly-fuse,' where the response time for opening the circuit is less than that required to induce rupture of the inductor 8 or the resistor 14. (*Id.*)

The actual performance can be customized according to the individual components used. For example, an inductor may be selected that accommodates voltages having predetermined transient characteristics, a resistor can be selected that limits steady state currents for a particular period of time, and a PPTC can be selected according to its melting temperature. In this manner, the surge protection device can be configured to optimize protection for a particular likelihood or risk of a known or suspected condition. For example, the environment for a particular application may have a high or low humidity, have a differing power factor, be proximate to high inductance machinery, have a greater susceptibility to a certain transient condition, or have differing grades of electrical utility wiring. By controlling the location of a possible arcing, the magnitude and resultant damage from an excessive overvoltage condition can be controlled. (*Id.*)

Fig. 4 shows a schematic block diagram of an exemplary electricity meter 110 that incorporates three surge protection devices 11a, 11b and 11c according to the present invention. The electricity meter 110 is shown in context installed in a three phase power system. The exemplary embodiment of the surge protection devices 11a, 11b and 11c described herein protects the meter circuitry, which is typically housed on one or more printed circuit boards, from unpredictable failure modes due to excessive overvoltages

and associated power follow through generated on the connected utility lines. (*Id.* at pp.13-14)

(6) ISSUES

Whether claim 1 is unpatentable under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,181,872 to Chermin (hereinafter "Chermin").

Whether claims 2-5, 25-29, 34 and 35 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Chermin in view of U.S. Patent No. 6,356,424 to Myong et al. (hereinafter "Myong").

Whether claims 30-33 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Chermin in view of U.S. Patent No. 6,040,971 to Martenson et al. (hereinafter "Martenson").

Whether claims 24 and 36 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Chermin in view of Myong in further view of Martenson.

(7) GROUPING OF CLAIMS

The claims do not all stand or fall together.

Claim 1 forms a first separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 3, 5 and 35 form a second separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 4, 25, 27-29, 34, 37 and 38 form a third separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claim 26 forms a fourth separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 30 and 32 form a fifth separately patentable group which is argued independently of the other claims for purposes of this appeal.

Claims 24, 31, 33 and 36 form a sixth separately patentable group which is argued independently of the other claims for purposes of this appeal.

(8) ARGUMENT

Discussion re: Patentability of Claim 1

1. Claim 1

Claim 1 includes the following limitations:

> a protective barrier interposed between the inductor and the load, the protective barrier configured to physically isolate the inductor from the load.

Thus, a protective barrier is proved that is configured to *physically* isolate the inductor from the load.

2. The Examiner's Rejection

The Examiner rejected claim 1 as allegedly being anticipated by Chermin. Chermin is directed to a starter for igniting a low-pressure sodium lamp. The starter is provided with an oscillator circuit consisiting of an electric coil, a first capacitor and a controlled semiconductor switching element. (See Chermin, Abstract). A positive temperature coefficient device is provided to increase the resistance of the circuit in the even that the lamp refuses to ignite.

The Examiner contends that claimed inductor was met by the inductive ballast 3 of Fig. 1 of Chermin. The Examiner further contends that the resistor 6, PTC 7, coil 8 and the inductive ballast 3 together constitute a "protective barrier" that physically isolates the inductive ballast 3 from the load. (Final Office Action at p. 2).

3. Chermin Does Not Teach a Protective Barrier

Chermin does not disclose any type of barrier at all, much less one that operates to *physically* isolate the ballast 3 from any load. Contrary to the Examiner's contention, the resistor 6, PCT 7, coil 8 and ballast 3 do not physically isolate anything, and certainly do not form a protective barrier. Chermin does not disclose how those elements are physically arranged, and nothing suggests they could be arranged to form a barrier.

In particular, the ordinary interpretation of a "protective barrier" configured to provide "physical isolation" is straightforward and consistent with the teachings of the application. As taught in the application,

> "a protective barrier 10 . . . separates or isolates the inductor 8, resistor 14, and PPTC 3 from the load 6. The protective barrier 10 may take infinitely various forms, but basically includes a wall, sleeve or compartment constructed of inflammable material, such as, for example, certain plastics."

(Application at p.9, lines 11-15).

Although the protective barrier may take many forms, it still includes a physical barrier of some type. The inductive ballast 3, resistor 6, PTC 7 and coil 8 do not form any type of protective or physical barrier. Those elements provide neither physical nor electrical isolation. Moreover, Chermin neither suggests or implies the need for a protective barrier between the inductor 3 and the load. It is noted that Chermin is not even directed to a surge protection apparatus.

For at least these reasons, it is submitted that the rejection of claim 1 as anticipated by Chermin is in error and should be reversed.

Second Claim Grouping: Claims 2, 3, 5 and 35 are Not Obvious Over Chermin and Myong

Discussion re: Patentability of Claim 2

1. Claim 2

Claim 2 has the following limitation:

> polymeric positive temperature coefficient device (PPTC) coupled between the voltage input and the load; and
> a protective barrier interposed between the PPTC and the load, the protective barrier configured to physically isolate the PPTC from the load

Accordingly, claim 2 includes a protective barrier similar to claim 1, except that the protective barrier surrounds a PPTC as opposed to an inductor.

2. The Prior Art Does Not Teach a Protective Barrier

As an initial matter, the Examiner has failed to set out a prima facie case of obviousness for similar reasons as those set forth above in connection with claim 1. In particular, the Examiner has rejected claim 2 as allegedly being obvious over Chermin in view of Myong. As discussed above in connection with claim 1, Chermin does not teach a protective barrier. The Examiner has not alleged that Myong teaches a protective barrier, nor does it appear that Myong contains any such teaching. Accordingly, the combination of Chermin and Myong as proposed by the Examiner does not arrive at the invention of claim 2.

3. No Motivation to Modify Chermin as Proposed by the Examiner

Claim 2 is patentable for reasons independent of those relating to the protective barrier. In particular, in the Final Office Action, the Examiner concedes that Chermin does not teach a PPTC. (Final Office Action at p.3) Instead, the Examiner alleges that it would have been obvious to combine the PPTC of Myong with the arrangement of Chermin. In particular, the Examiner set forth the following reasoning for the proposed combination:

> Chermin does not disclose a polymeric positive temperature coefficient. Myong et al. disclose a polymer PTC (col. 1, lines 46). It would have been obvious to one having skill in the art to modify the circuit of Chermin with a PPTC as taught by Myong in order to protect components from excess current or temperature (Myong et al., col. 1, lines 29-42).

(Final Office Action at p.3).

Applicants respectfully submit that there is no motivation or suggestion to combine Chermin and Myong as proposed by the Examiner. As an initial matter, Chermin employs a PTC to *reduce power consumption* in a sodium gas lamp igniter when the lamp will not ignite. (See e.g. Chermin at col. 1, lines 21-32). Chermin does not appear to require anything to "protect components from excess current or temperature", as suggested by the Examiner. Moreover, Myong does not appear to suggest that a PPTC is more capable of protecting components from excess current or temperature than other PTCs.

At best, Myong suggests that PPTCs "have higher resistivities" than other PTCs. (Myong at col. 1, lines 37-41). However, it is not entirely clear that a higher resistivity translates into better protection against excess current or temperature. Even if higher resistivity provided better protection, Chermin is not directed to a device having the primary purpose of protection against overcurrent or temperature. The PTC of Chermin

instead is intended to reduce current when the operation of the igniter is not necessary. To this end, the PTC of Chermin provides a load-shedding function.

Myong contains no teaching that a PPTC is particularly advantageous in a device similar to that of Chermin. Instead, Myong is directed to traditional fault handling operations and protection against overcurrent. While a higher resistivity might be useful in such situations, Myong neither suggests nor implies that higher resistivity is useful in *all* applications of PTCs. Thus, Myong does not suggest that a PPTC is advantageous over a PTC in the circuit of Chermin.

For this reason, as well as the reason that neither reference teaches a protective barrier as claimed, it is respectfully submitted that the rejection of claim 2 as being obvious over Chermin in view of Myong is in error and should be reversed.

Discussion re: Patentability of Claim 3

Claim 3 stands rejected as allegedly being obvious over Chermin in view of Myong. Claim 3 incorporates all of the limitations of claim 1, and therefore recites a protective barrier. Claim 3 further recites the PPTC that is isolated from the load by the protective barrier, similar to claim 2. As discussed above, neither Chermin nor Myong teach such a protective barrier. Moreover, there is no legally sufficient motivation or suggestion to modify Chermin to include a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 2, it is respectfully submitted that the obviousness rejection of claim 3 should be reversed.

Discussion re: Patentability of Claim 5

Claim 5 stands rejected as allegedly being obvious over Chermin in view of Myong. Claim 5 recites "a protective barrier interposed between the load and the inductor, the resistor and the PPTC, the protective barrier configured to physically isolate the inductor, the resistor and the PPTC from the load". As discussed above, neither Chermin nor Myong teach such a protective barrier. Moreover, there is no legally sufficient motivation or suggestion to modify Chermin to include a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 2, it is respectfully submitted that the obviousness rejection of claim 5 should be reversed.

Discussion re: Patentability of Claim 35

Claim 35 stands rejected as allegedly being obvious over Chermin in view of Myong. Claim 35 recites "a protective barrier configured to physically isolate both the inductor and the PPTC from the load". As discussed above, neither Chermin nor Myong teach such a protective barrier. Moreover, there is no legally sufficient motivation or suggestion to modify Chermin to include a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 2, it is respectfully submitted that the obviousness rejection of claim 5 should be reversed.

Third Claim Grouping: Claims 4, 25, 27-29, 34, 37 and 38 are Not Obvious Over Chermin and Myong

Discussion re: Patentability of Claim 4

1. Claim 4

Claim 4 has the following limitation:

> an inductor, a separate resistor, and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load

Claim 4 differs from the First and Second Claim Groupings in that it does not recite a protective barrier.

2. No Motivation to Combine References

As discussed above in connection with claim 2, the Examiner concedes that Chermin does not teach the use of a PPTC. (Final Office Action at p.3). Instead, the Examiner alleges that it would have been obvious to combine the PPTC of Myong with the arrangement of Chermin. As also discussed above, there is no motivation or suggestion to combine Chermin and Myong as proposed by the Examiner.

In particular, Chermin employs a PTC to reduce power consumption in a sodium gas lamp igniter when the lamp will not ignite. (See e.g. Chermin at col. 1, lines 21-32). Chermin does not appear to require anything to "protect components from excess current or temperature", as suggested by the Examiner. Chermin does not allege that there is a danger of excess currents or temperature. The PTC device is used as part of normal operation, and changes state effectively *when a light bulb burns out*. Thus, whatever motivation is provided by Myong to use a PPTC is not applicable to Chermin.

Accordingly, for reasons discussed above in connection with claim 2, the Examiner has not set forth a legally sufficient motivation or suggestion to modify Chermin to include a PPTC such as is taught by Myong.

Discussion re: Patentability of Claims 25 and 27-29

Claims 25 and 27-29 also stand rejected as allegedly being obvious over Chermin in view of Myong. Claims 25 and 27-29 all depend from and incorporate all of the limitations of claim 4. Accordingly, for at least the same reasons as those set forth above in connection with claim 4, it is respectfully submitted that the obviousness rejection of claims 25 and 27-29 should be reversed.

Discussion re: Patentability of Claim 34

Claim 34 also stands rejected as allegedly being obvious over Chermin in view of Myong. Claim 34 recites the following limitation: "an inductor and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load, the inductor interposed between the PPTC and the voltage input". Thus, claim 34, similar to claim 4 recites a PPTC and an inductor couple between the voltage input and the load. As discussed above, there is no legally sufficient motivation or suggestion to modify Chermin to include a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 4, it is respectfully submitted that the obviousness rejection of claim 34 should be reversed.

Discussion re: Patentability of Claims 37 and 38

Claims 37 and 38 stand rejected as allegedly being obvious over Chermin in view of Myong. Claims 37 and 38 both depend from and incorporate all of the limitations of claim 34. Accordingly, for at least the same reasons as those set forth above in connection with claim 34, it is respectfully submitted that the obviousness rejection of claims 37 and 38 should be reversed.

Fourth Claim Grouping: Claim 26 is Not Obvious Over Chermin and Myong

Discussion re: Patentability of Claim 26

1. Claim 26 depends from Claim 25

Claim 26 stands rejected as allegedly being obvious over Chermin in view of Myong. As an initial matter, claim 26 depends from and incorporates all the limitations of claim 25. As discussed above, claim 25 depends from and incorporates all of the limitations of claim 4. Accordingly, claim 26 is patentable over the prior art for at least the same reasons as those set forth above in connection with claims 4 and 25.

2. Additional Limitations of Claims 26

Claims 26 also recites the following limitations:

> wherein the separate resistor has a resistance of approximately 50 ohms

3. Chermin Does Not Teach or Suggest a Fifty Ohm Resistor

With regard to claim 26, the Examiner merely alleges that Chermin discloses a 220 ohm resistor. (Final Office Action at p.3). A 220 ohm resistor exceeds the resistance

of a 50 ohm resistor by more than a factor of four. One of ordinary skill in the art would not consider the quantity of 220 ohms to be approximately 50 ohms.

Accordingly, the combination of Chermin and Myong fails to teach all of the elements of claim 26. As a consequence, for reasons independent of those set forth above in connection with claim 4, it is submitted that the rejection of claim 26 is in error and should be reversed.

Fifth Claim Grouping: Claims 30 and 32 Are Not Obvious Over Chermin and Martenson

Discussion re: Patentability of Claim 30

1. Claim 30 depends from Claim 1

Claim 30 stands rejected as allegedly being obvious over Chermin, Myong and Martenson. As an initial matter, claim 30 depends from and incorporates all the limitations of claim 1. Claim 30 also recites the following limitations:

> wherein the protective barrier includes a protective sleeve that receives the inductor

2. None of the Prior Art Discloses a Protective Sleeve

None of the cited art discloses a protective sleeve. In the Final Office Action, the Examiner appears to admit that Chermin does not teach a protective sleeve. (See generally p.4). Instead, the Examiner relies on Martenson for the teaching of a protective housing. (*Id.*)

The plastic housing of Martenson does not constitute a protective sleeve, as per claim 30. The plastic housing is a box-like compartment, which is not a sleeve. For this reason, among others, the rejection of claim 30 over the combination of Chermin and

Martenson should be reversed.

3. No Motivation or Suggestion to Combine Chermin and Martenson as Proposed

Claim 30 is also patentable because there is no motivation to combine Chermin and Martenson as proposed by the Examiner. As discussed above, the Examiner contends that it would have been obvious to combine the housing 32 of Martenson with the arrangement of Chermin. In particular, the Examiner set forth the following reasoning for the proposed combination:

> Chermin does not explicitly disclose a plastic housing houses the components of the circuit. Martenson et al. disclose a housing 32 (fig. 2). It would have been obvious to one having skill in the art to modify the circuit of Chermin with a housing as taught by Martenson et al. in order to protect the sudden failure of the components of the circuit that result in breakdown of an entire system.

(Final Office Action at p.4).

Applicants respectfully submit that the Examiner has set forth no legally sufficient motivation or suggestion to combine Chermin and Martenson as proposed. First, there is no teaching or suggestion of a need for protection against sudden failure in Chermin. Chermin and Martenson are directed to vastly different devices having different needs. There is no indication that there is a need for protection in Chermin similar to the need for protection in Martenson. Moreover, even if protection against sudden failure was advantageous in Chermin, there is no indication that the inductor of Chermin is subject to a catastrophic failure, and thus requires a protective housing.

With regard to the need for protection, Martenson is directed to surge protection devices for "highly sensitive electronic components". These highly sensitive electronic components include computer and computer-related equipment. Such devices, it is noted, have significant amounts of digital processing circuitry, as well a disk drive motors,

screen displays and the like. As a consequence of the sensitivity, complexity and expense of such circuits, complex surge protection circuits such as the type shown in Figs. 1 and 2 of Martenson are justified.

By contrast, Chermin is directed to a sodium gas lamp and its igniter circuit. There are very few circuit elements in Chermin as compared to a computer and computer-related equipment. Such elements, moreover, would seem to be something less than "highly sensitive". Thus, the circuit of Chermin does not need a complex surge protection circuit similar to that of Martenson, nor all of the protections it affords. Indeed, if one or two elements of Chermin were to catastrophically fail, it probably would not be significantly more expensive as a practical matter to replace the whole circuit of Chermin.

In contrast to a mere lamp exciter circuit, the failure of a computer system is significantly more costly, and thus may justify additional protective housing elements as taught Martenson. In other words, Martenson simply does not suggest the desirability of a plastic housing for all circuits of all kinds.

In addition, neither Martenson nor Chermin suggest that an inductor is prone to catastrophic failure, and thus would require a housing for protection of the exciter circuit. As a consequence, even if the prior art contained a suggestion to provide protection against catastrophic failure in a lamp igniter circuit, none of the prior art imply that the inductor of Chermin would be the source of the catastrophic failure.

In particular, to the extent Martenson teaches the use of a housing for protection, Martenson teaches the use of a housing specifically to protect against the catastrophic failure of MOVs. To this end, Martenson describes the existence of a problem with the

catastrophic failure of MOVs when they are used for surge protection. (See Martenson at col. 2, lines 62). Martenson teaches the use of the plastic housing 32 which helps in the event of a catastrophic failure of an MOV. (See *id.* at col. 9, lines 40-47).

However, Chermin does not employ an MOV, and therefore is not prone to catastrophic failures of MOVs. As a consequence, nothing in Martenson could be interpreted as suggesting the employment of a plastic housing for one or more devices in Chermin.

In conclusion, it is clear that Martenson and Chermin are directed to different components (MOV vs. inductor) in a different circuit (surge protection vs. lamp igniter) in a different environment (computer devices vs. gas lamp). For this reason, it is respectfully submitted that there is no motivation or suggestion to modify Chermin to employ the housing of Martenson.

For this reason, as well as the reason that neither reference teaches a protective sleeve as claimed, it is respectfully submitted that the rejection of claim 30 as being obvious over Chermin in view of Martenson is in error and should be reversed.

Discussion re: Patentability of Claim 32

Claim 32 also stands rejected as allegedly being obvious over Chermin in view of Martenson. Claim 32 recites the following limitation: "a protective barrier interposed between the inductor and the load, the protective barrier configured to physically isolate the inductor from the load, the protective barrier including a protective sleeve that receives the inductor". Thus, claim 32, similar to claim 30 recites an inductor received by a protective sleeve. As discussed above, neither Chermin nor Martenson teach or

suggest a protective sleeve. Moreover, there is no legally sufficient motivation or suggestion to modify Chermin to include a protective housing, much less a sleeve. Accordingly, for at least the same reasons as those set forth above in connection with claim 30, it is respectfully submitted that the obviousness rejection of claim 32 should be reversed.

Sixth Claim Grouping: Claims 24, 31, 33 and 36 Are Not Obvious Over the Prior Art

Discussion re: Patentability of Claim 24

1. Claim 24 Recites a PPTC

Claim 24 stands rejected as allegedly being obvious over Chermin, Myong and Martenson. As an initial matter, claim 24 depends from and incorporates all the limitations of claim 5. As a consequence, claim 24 includes a limitation directed to a PPTC connected to the inductor. As discussed above in connection with the Second Claim Grouping, there is no motivation or suggestion to modify Chermin by implementing the PPTC of Myong. In addition, Martenson does not teach or suggest the use of a PPTC.

2. Claim 24 Also Recites a Protective Sleeve

Claim 24 also recites the following limitations:

> wherein the protective barrier includes a protective sleeve

As discussed above in connection with claim 30, none of the cited art discloses a protective sleeve. Moreover, even if the housing of Martenson could be construed to be a

sleeve, there is no motivation or suggestion to modify Chermin to include the housing of Martenson.

Thus, because there is no motivation or suggestion to modify Chermin to include the PPTC of Myong, because there is no motivation or suggestion to modify Chermin to include the plastic housing of Martenson, and because none of Chermin, Myong and Martenson teach or suggest a protective sleeve, the rejection of claim 24 should be reversed.

Discussion re: Patentability of Claims 31, 33 and 36

Claims 31, 33 and 36 all include limitations directed to a protective sleeve and a PPTC. Accordingly, for at least the same reasons as those set forth above in connection with claim 24, it is respectfully submitted that the obviousness rejection of claims 31, 33 and 36 should be reversed.

(9) CONCLUSION

For all of the foregoing reasons, claim 1 is not unpatentable under 35 U.S.C. § 102(b), and claims 2-5 and 24-38 are not unpatentable under 35 U.S.C. § 103(a). As a consequence, the Board of Appeals is respectfully requested to reverse the rejection of these claims.

Respectfully submitted,

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CLAIM APPENDIX

1. (amended) A surge protection apparatus connected between an AC electrical utility power line and a load, comprising:

a voltage input coupled to the AC electrical utility power line, the AC electrical utility power line having a nominal AC voltage of at least about 120 volts;

an inductor coupled between the voltage input and the load; and

a protective barrier interposed between the inductor and the load, the protective barrier configured to physically isolate the inductor from the load.

2. (amended) A surge protection apparatus connected between an AC electrical utility power line and a load, comprising:

a voltage input coupled to the AC electrical utility power line, the AC electrical utility power line having a nominal AC voltage of at least about 120 volts;

an polymeric positive temperature coefficient device (PPTC) coupled between the voltage input and the load; and

a protective barrier interposed between the PPTC and the load, the protective barrier configured to physically isolate the PPTC from the load.

3. An apparatus as claimed in claim 1, further comprising a polymeric positive temperature coefficient device (PPTC) connected in series with the inductor between the voltage source and the load, wherein the protective barrier is configured to physically isolate both the inductor and the PPTC from the load.

4. (amended) A surge protection apparatus connected between an electrical power line and a load, comprising:

a voltage input coupled to the electrical power line;

an inductor, a separate resistor, and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load.

5. The surge protection apparatus of claim 4, further comprising a protective barrier interposed between the load and the inductor, the resistor and the PPTC, the protective barrier configured to physically isolate the inductor, the resistor and the PPTC from the load.

24. The surge protection apparatus of claim 5 wherein the protective barrier includes a protective sleeve.

25. The surge protection apparatus of claim 4 wherein the separate resistor has a resistance of at least 10 ohms.

26. The surge protection apparatus of claim 25 wherein the separate resistor has a resistance of approximately 50 ohms.

27. The surge protection apparatus of claim 4 wherein the separate resistor includes axial leads.

28. The surge protection apparatus of claim 4 wherein the inductor is interposed between the voltage input and PPTC.

29. The surge protection apparatus of claim 4 wherein the voltage input is coupled to an AC electrical utility power line.

30. The surge protection apparatus of claim 1 wherein the protective barrier includes a protective sleeve that receives the inductor.

31. The surge protection apparatus of claim 2 wherein the protective barrier includes a protective sleeve that receives the PPTC.

32. A surge protection apparatus connected between an electrical power line source and a load, comprising:

a voltage input coupled to the electrical power line;

an inductor coupled between the voltage input and the load; and

a protective barrier interposed between the inductor and the load, the protective barrier configured to physically isolate the inductor from the load, the protective barrier including a protective sleeve that receives the inductor.

33. The surge protection apparatus of claim 32 further comprising a PPTC coupled in series with the inductor between the voltage input and the load, the PPTC received by the protective sleeve.

34. A surge protection apparatus connected between an electrical power line source and a load, comprising:

a voltage input coupled to the electrical power line; and

an inductor and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load, the inductor interposed between the PPTC and the voltage input.

35. The surge protection apparatus of claim 34 further comprising:

a protective barrier configured to physically isolate both the inductor and the PPTC from the load.

36. The surge protection apparatus of claim 35 wherein the protective barrier includes a protective sleeve that receives the inductor and the PPTC.

37. A surge protection apparatus connected between an electrical power line and a load, comprising:

a voltage input coupled to the electrical power line;

an inductor, a resistor having a resistance of at least about 10 ohms, and a polymeric positive coefficient temperature device (PPTC) coupled in series between the voltage input and the load.

38. (new) The surge protection apparatus of claim 37 wherein the resistor includes axial leads.